



ORIGINAL



0000179477

Direct: (602) 530-8191  
Email: jennifer.cranston@gknet.com

May 3, 2017

**HAND DELIVERED**

Docket Control  
Arizona Corporation Commission  
1200 W. Washington St.  
Phoenix, AZ 85007

Arizona Corporation Commission

**DOCKETED**

MAY 3 2017

DOCKETED BY

RECEIVED  
AZ CORP COMMISSION  
DOCKET CONTROL  
2017 MAY - 3 1 P 4: 36

Re: *Arizona Electric Power Cooperative, Inc.'s ("AEPSCO") Resource Planning Filing Pursuant to R14-2-703.C-F and H (the "Resource Planning Filing"); Docket No. E-00000V-15-0094*

Dear Sir or Madam:

Pursuant to the requirements of Arizona Administrative Code R14-2-703.C-F and H and Decision No. 76060, enclosed are the original and 13 copies of the Public Version of AEPSCO's Resource Planning Filing. Your assistance in relation to this matter is appreciated.

Sincerely,

GALLAGHER & KENNEDY, P.A.

By:   
Jennifer A. Cranston

JAC/plp  
Enclosure  
10421-78/5977506

**Original and 13 copies** filed with Docket Control this 3rd day of May, 2017.

**Arizona Electric Power Cooperative, Inc.**

**Resource Planning Filing  
R14-2-703.C-F and H**

**Docket No. E-00000V-15-0094**

**May 3, 2017**

**Public Version**

**THIS DOCUMENT CONTAINS CONFIDENTIAL  
INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND  
STAFF DATED March 23, 2015**

## Preface

This is AEPCO's third Resource Planning Filing pursuant to the requirements of R14-2-703.C-F and H of the Commission's Resource Planning and Procurement Rules (effective December 20, 2010) ("the IRP Rules"). AEPCO's previous filings were made on March 30, 2012 and April 1, 2014.

AEPCO is unique among the load-serving entities covered by the IRP Rules. First, it supplies power only at wholesale to its Class A member distribution cooperatives. Therefore, it has no demand side role in the "integrated" resource planning process. As the Commission's decision on the initial round of IRP filings noted, "each IRP (other than AEPCO's) must meet the requirements of the Annual Renewable Energy Requirement, the Distributed Renewable Energy Requirement, and the Energy Efficiency Standard." Decision No. 73884 at page 3, ll. 11-13 (the "First IRP Order"). AEPCO's distinction from the other load-serving entities was reiterated in the Commission's next IRP docket. *See* Decision No. 75068 at page 3, ll. 14-16 (the "Second IRP Order").

Further, AEPCO's supply side role is limited. In Arizona, it has all-requirements contracts (i.e., contracts requiring AEPCO to resource plan for the future demands of the member) with only two of its smallest distribution cooperative Members, i.e., the Graham County Electric Cooperative ("Graham") and the Duncan Valley Electric Cooperative ("Duncan"). The other three and largest Arizona Member distribution cooperatives are Partial-Requirements Members ("PRM"). Under these PRM arrangements, AEPCO's only obligation is to furnish contractually obligated amounts of power and energy to the PRMs from existing resources, i.e., it has no obligation to plan for the future growth needs of Sulphur Springs Valley Electric Cooperative ("Sulphur"), Trico Electric Cooperative ("Trico") and Mohave Electric Cooperative ("Mohave").

The Commission recognized these and other differences between AEPCO and the other entities covered by the IRP Rules in its prior decisions. Specifically, in addition to recognizing that it plays no demand side role in the planning process, the Commission "acknowledged" the 2012 IRP but stated it would not be necessary for AEPCO to have "its future IRPs acknowledged by the Commission." (First IRP Order, Finding 14.) The Commission also stated that AEPCO should continue to submit in future IRP filings "whatever information, data, criteria, and studies it has used in its 15-year planning scenarios"—concluding that such information is sufficient for AEPCO to meet its IRP Rules' obligations given its unique and very limited role. (First IRP Order, Finding 15.) The Commission further instructed AEPCO to provide its "PRMs load forecasts to Staff on a confidential basis when it files its IRP" (Finding 16 and Second Ordering paragraph at page 8). Finally, the Commission ordered that AEPCO continue in the "IRP process but without the necessity of having its future IRPs acknowledged." (First IRP Order, First Ordering Paragraph on page 8.)

In the second IRP proceeding, AEPCO submitted an IRP conforming to the Commission's above-referenced instructions. In response, the Commission confirmed that AEPCO's IRP satisfied the requirements of the First IRP Order. (Second IRP Order, Second Ordering Paragraph on page 14.)

In September of 2015, the Commission issued Decision No. 75269, which adopted a revised schedule for the submissions of the utilities' IRP filings in this docket, and extended the required filing date until April 3, 2017.<sup>1</sup> The Commission's revised schedule was based in part on the Environmental Protection Agency's ("EPA") then-recent announcement of the Clean Power Plan ("CPP"). The Decision explained that the extension was intended to "accommodate the added analytical burden of accounting for the EPA final rulemaking." (Finding 4.)

Pursuant to Decision No. 75269, AEPCO filed its Preliminary IRP on September 1, 2016. The Preliminary IRP included the various components required by the Commission and further referenced AEPCO's work with its Members to continue its analysis of both resource needs and available resource options as circumstances regarding the CPP and Arizona State Implementation Plan evolve. Unfortunately, considerable uncertainty continues to surround the CPP in light of the Stay issued by the U.S. Supreme Court in 2016 and subsequent change in EPA administration.

This third Resource Planning Filing complies with the requirements identified in the First IRP Order, including the "information, data, criteria, and studies" AEPCO has used in its latest 15-year planning activities. This filing also includes the analyses described in AEPCO's Preliminary IRP filing as well as a resource portfolio evaluation based on the forecasted resource needs of all its Class A Members (including the PRMs). Although (as stated previously) AEPCO's resource planning obligation is limited to its All-Requirements Members, this filing includes an initial evaluation of potential resource expansion to address PRM resource needs under a variety of scenarios concerning the CPP and possible future energy market developments. The resource alternatives identified in AEPCO's IRP represent the variety of resource options being considered, but should not be construed as a determination by AEPCO or its Members.

Finally, with reference to the First IRP Order, AEPCO has not provided the PRM load forecasts separately because this third Resource Planning Filing incorporates them into AEPCO's modeling.

---

<sup>1</sup> On April 11, 2017, the Commission approved AEPCO's request to further extend the IRP filing deadline to May 3, 2017. Decision No. 76060.



# INDEX

## Requirement

## Page No.

C.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following items of load data and analyses, which may include a reference to the last filing made under this subsection for each item for which there has been no change in forecast since the last filing:	
1. Fifteen-year forecast of system coincident peak load (megawatts) and energy consumption (megawatt-hours) by month and year, expressed separately for residential, commercial, industrial, and other customer classes, for interruptible power; for resale; and for energy losses.....	1
2. Disaggregation of the load forecast of subsection (C)(1) into a component in which no additional demand management measures are assumed, and a component assuming the change in load due to additional forecasted demand management measures.....	12
3. Documentation of all sources of data, analyses, methods, and assumptions used in making the load forecasts, including a description of how the forecasts were benchmarked and justifications for selecting the methods and assumptions used.....	13
D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:	
1. A fifteen-year resource plan, providing for each year:	
a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment.....	14
b. Projected data for each of the items listed in subsection (B)(2), for the power supply system.....	42
c. The capital cost, construction time, and construction spending schedule for each generating unit expected to be new or refurbished during the period.....	50

# INDEX

Requirement	Page No.
d. The escalation levels assumed for each component of cost, such as, but not limited to, operating and maintenance, environmental compliance, system integration, backup capacity, and transmission delivery, for each generating unit and purchased power source.....	51
e. If discontinuation, decommissioning, or mothballing of any power source or permanent derating of any generating facility is expected:	
i. Identification of each power source or generating unit involved;	
ii. The costs and spending schedule for each discontinuation, decommissioning, mothballing, or derating; and	
iii. The reasons for each discontinuation, decommissioning, mothballing, or derating.....	52
f. The capital costs and operating and maintenance costs of all expected new or refurbished transmission and distribution facilities during the 15-year period.....	53
g. An explanation of the need for and purpose of all expected new or refurbished transmission and distribution facilities, which explanation shall incorporate the load-serving entity's most recent transmission plan filed under A.R.S. § 40-360.02(A) and any relevant provisions of the Commission's most recent Biennial Transmission Assessment decision regarding the adequacy of transmission facilities in Arizona.....	54
h. Cost analyses and cost projections, including the cost of compliance with existing and expected environmental regulations.....	55
2. Documentation of the data, assumptions, and methods or models used to forecast production costs and power production for the fifteen-year resource plan, including the method by which the forecast was benchmarked.....	57
3. A description of:	
a. Each potential power source that was rejected;	
b. The capital costs, operating costs, and maintenance costs of each rejected source; and	
c. The reasons for rejecting each source.....	58
4. A fifteen-year forecast of self-generation by customers of the load-serving entity, in terms of annual peak production (megawatts) and annual energy production (megawatt-hours).....	59
5. Disaggregation of the forecast of subsection (D)(4) into two components, one reflecting the self-generation projected if no additional efforts are made to encourage self-generation, and one reflecting the self-generation projected to result from the load-serving entity's institution of additional forecasted self-generation measures.....	60

# INDEX

Requirement	Page No.
6. A fifteen-year forecast of the annual capital costs and operating and maintenance costs of the self generation identified under subsection (D)(4) and (5).....	61
7. Documentation of the analysis of the self-generation under subsections (D)(4) through (6).....	62
8. A plan that considers using a wide range of resources and promotes fuel and technology diversity within its portfolio.....	63
9. A calculation of the benefits of generation using renewable energy resources	64
10. A plan that factors in the delivered cost of all resource options, including costs associated with environmental compliance, system integration, backup capacity, and transmission delivery.....	65
11. Analysis of integration costs for intermittent resources.....	66
12. A plan to increase the efficiency of the load-serving entity's generation using fossil fuel.....	67
13. Data to support technology choices for supply-side resources.....	68
14. A description of the demand management programs or measures included in the fifteen-year resource plan, including for each demand management program or measure:	
a. How and when the program or measure will be implemented;	
b. The projected participation level by customer class for the program or measure;	
c. The expected change in peak demand and energy consumption resulting from the program or measure;	
d. The expected reduction in environmental impacts, including air emissions, solid waste, and water consumption, attributable to the program or measure;	
e. The expected societal benefits, societal costs, and cost-effectiveness of the program or measure;	
f. The expected life of the measure; and	
g. The capital costs, operating costs, and maintenance costs of the measure, and the program costs.....	69

# INDEX

Requirement	Page No.
15. For each demand management measure that was considered but rejected:	
a. A description of the measure;	
b. The estimated change in peak demand energy consumption from the measure;	
c. The estimated cost-effectiveness of the measure;	
d. The capital costs, operating costs, and maintenance costs of the measure, and the program costs; and	
e. The reasons for rejecting the measure.....	70
16. Analysis of future fuel supplies that are part of the resource plan.....	71
17. A plan for reducing environmental impacts related to air emissions, solid waste, and other environmental factors, and for reducing water consumption.....	73
E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:	
1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:	
a. Demand forecasts.....	74
b. The costs of demand management measures and power supply.....	76
c. The availability of sources of power.....	77
d. The costs of compliance with existing and expected environmental regulations.....	79
e. Any analysis by the load-serving entity in anticipation of potential new or enhanced environmental regulations.....	80
f. Changes in fuel prices and availability.....	81
g. Construction costs, capital costs, and operating costs.....	82
2. A description and analysis of available means for managing the errors, risks, and uncertainties identified and analyzed in subsection (E)(1), such as obtaining additional information, limiting risk exposure, using incentives, creating additional options, incorporating flexibility, and participating in regional generation and transmission projects.....	85
3. A plan to manage the errors, risks, and uncertainties identified and analyzed in subsection (E)(1).....	85

# INDEX

Requirement	Page No.
F.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a fifteen-year resource plan that:	
1. Selects a portfolio of resources based upon comprehensive consideration of a wide range of supply- and demand-side options.....	86
2. Will result in the load-serving entity's reliably serving the demand for electric energy services.....	86
3. Will address the adverse environmental impacts of power production.....	86
4. Will include renewable energy resources to meet or exceed the greater of the Annual Renewable Energy Requirement in R14-2-1804 or the following annual percentages of retail kWh sold by the load-serving entity.....	86
5. Will include distributed generation energy resources to meet or exceed the greater of the Distributed Renewable Energy Requirement in R14-2-1805 or the following annual percentages as applied to the load-serving entity's Annual Renewable Energy Requirement.....	86
6. Will address energy efficiency so as to meet any requirements set in rule by the Commission or in an order of the Commission.....	86
7. Will effectively manage the uncertainty and risks associated with costs, environmental impacts, load forecasts, and other factors.....	87
8. Will achieve a reasonable long-term total cost, taking into consideration the objectives set forth in subsections (F)(2) through (7) and the uncertainty of future costs.....	87
9. Contains all of the following:	
a. A complete description and documentation of the plan, including supply and demand conditions, availability of transmission, costs, and discount rates utilized.....	107
b. A comprehensive, self-explanatory load and resources table summarizing the plan.....	108
c. A brief executive summary.....	111
d. An index to indicate where the responses to each filing requirement of these rules can be found.....	115
e. Definitions of the terms used in the plan.....	116

# INDEX

Requirement	Page No.
H.) With its resource plan, a load-serving entity shall include an action plan, based on the results of the resource planning process, that:	
1. Includes a summary of actions to be taken on future resource acquisitions.....	118
2. Includes details on resource types, resources capacity, and resource timing....	118
3. Covers the three-year period following the Commission's acknowledgment of the resource plan.....	118



## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**C.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following items of load data and analyses, which may include a reference to the last filing made under this subsection for each item for which there has been no change in forecast since the last filing:**

1. Fifteen-year forecast of system coincident peak load (megawatts) and energy consumption (megawatt-hours) by month and year, expressed separately for residential, commercial, industrial, and other customer classes, for interruptible power; for resale; and for energy losses;

---

AEPCO has an obligation to provide resource planning on behalf of its All-Requirements Members, referred to collectively as CARM. The CARM include two Class A Member distribution cooperatives located within Arizona -- Duncan and Graham -- as well as a third Class A Member located outside of Arizona, Anza Electric Cooperative, Inc. AEPCO's obligation to its other three Class A Members, the PRMs, is limited to furnishing contractually obligated amounts of power and energy from existing resources and does not include planning for additional current or future needs. However, given that the recent resource planning studies described in this filing include modeling of total load requirements for all of AEPCO's Class A Members (both CARM and PRMs), a summary of demand and energy requirements for both groups have been provided below.

AEPCO's peak demand forecast covers the entirety of these Class A Members' loads, and does not distinguish by retail customer class. Therefore, AEPCO has not provided the peak demand information disaggregated by consumer class.

The energy tables include data concerning residential, irrigation, small commercial, large commercial, and special contracts customers (if applicable), and highway lighting derived from the load forecasts for CARM and all Class A Members. The estimated distribution losses are also provided.

AEPCO's load forecast report is provided in Tab A.

## **2017 Integrated 15-Year Resource Plan**

[Begin Confidential Information]

[Response continues on next page.]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**



## **2017 Integrated 15-Year Resource Plan**

[Continue Confidential Information]

[Response continues on next page.]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEP CO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

**2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703. Load-serving Entity Reporting Requirements**

**C.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following items of load data and analyses, which may include a reference to the last filing made under this subsection for each item for which there has been no change in forecast since the last filing:**

2. Disaggregation of the load forecast of subsection (C)(1) into a component in which no additional demand management measures are assumed, and a component assuming the change in load due to additional forecasted demand management measures; and

---

AEPCO is unique among entities covered by the IRP Rules in that it supplies power only at wholesale predominately to its Class A Members and, therefore, serves no demand-side role in the integrated resource planning process. As a result, AEPCO has no information to report concerning these components.



## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

C.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following items of load data and analyses, which may include a reference to the last filing made under this subsection for each item for which there has been no change in forecast since the last filing:

3. Documentation of all sources of data, analyses, methods, and assumptions used in making the load forecasts, including a description of how the forecasts were benchmarked and justifications for selecting the methods and assumptions used.

---

A complete copy of AEPCO's 2016 Load Forecast Report, approved by the AEPCO Board of Directors on September 14, 2016 and the Rural Utilities Service (RUS) on January 10, 2017 is included behind Tab A. This document details the methods and assumptions utilized in AEPCO's load forecast development. **The information contained in the AEPCO 2016 Load Forecast Report is confidential and its use and availability is restricted pursuant to the terms of the Protective Agreement between AEPCO and Staff dated March 23, 2015.**

As shown in part C.1., this official forecast was adjusted to account for the following factors, which yield the load which AEPCO's IRP model would serve:

- Reduction of load due to a 10MW Member solar installation in 2018.
- Increase of AEPCO required load for transmission losses at AEPCO's network rate of 2.31%.
- Reduction of load as a result of the 2017 solar project at Apache Generating Station.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

**B-1        For each generating unit and purchased power contract:**

- a. In-service date and book life or contract period;
- b. Type of generating unit or contract;
- c. The load-serving entity's share of the generating unit's capacity, or of capacity under the contract, in megawatts;

**[Response begins on next page.]**

## **2017 Integrated 15-Year Resource Plan**

The in-service dates, Class A Member contract end dates, type, and capacity of AEPCO's existing generating units and purchased power contracts are detailed below.

**[Begin Confidential Information]**

**[End Confidential Information]**

With regard to "new" resources, AEPCO's IRP studies include certain prospective resource options. While AEPCO is not selecting a resource plan as part of its IRP submission, the resources identified in the modeling can be found in part F, and the resource assumptions are included behind Tab C.

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN AEPCO  
AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- d. Maximum generating unit or contract capacity, by hour, day, or month, if such capacity varies during the year;

AEPCO's maximum net generating unit capacity for its physical generating units does not vary during the year.

AEPCO's purchase power contracts with seasonal capacities are listed below:

[Response continues on next page.]

## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### 14-2-703.      Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1      For each generating unit and purchased power contract:

- e. Annual capacity factor (generating units only);

AEPCO has provided projected capacity factors for each of AEPCO's dispatchable generating units, included those selected by AEPCO's resource planning model in the various scenarios considered. Prospective units, rather than those currently existing in AEPCO's portfolio, are denoted by italics. Prospective renewable projects assumed a constant capacity factor in keeping with AEPCO's assumptions for these projects, detailed behind Tab C.

**[Response continues on next page.]**



## 2017 Integrated 15-Year Resource Plan

[Begin Confidential Information]

[Response continues on next page.]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**

**2017 Integrated 15-Year Resource Plan**

[Continue Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- f. Average heat rate of generating units and, if available, heat rates at selected output levels;

Included behind Tab C are the assumed average heat rates for each of AEPCO's dispatchable generating units, as well as heat rates for prospective units considered for selection in AEPCO's resource expansion modeling.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- g. Average fuel cost for generating units, in dollars per million Btu for each type of fuel;  
[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- h. Other variable operating and maintenance costs for generating units, in dollars per megawatt hour;

[Response begins on next page.]

## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- i. Purchased power energy costs for long-term contracts, in dollars per megawatt-hour;

[Response begins on next page.]

**2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN AEPCO  
AND STAFF DATED MARCH 23, 2015.**



## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

**B-1            For each generating unit and purchased power contract:**

- j. Fixed operating and maintenance costs of generating units, in dollars per megawatt;

**[Begin Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- k. Demand charges for purchased power;

[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703.    Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

**B-1**            For each generating unit and purchased power contract:

1. Fuel type for each generating unit;

#### Primary & Secondary Fuel Types for Each Unit

Unit	2017		2018-2031	
	Primary Fuel	Secondary Fuel	Primary Fuel	Secondary Fuel
Combined Cycle (GT1 + ST1)	Natural Gas	None	Natural Gas	None
Gas Turbine 2	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Gas Turbine 3	Natural Gas	None	Natural Gas	None
Gas Turbine 4 *	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Steam Turbine 2 **	Coal	Natural Gas	Natural Gas	None
Steam Turbine 3	Coal	Natural Gas	Coal	Natural Gas

\*Secondary fuel is permitted for emergency backup only. Limited to 600 hours per year.

\*\*In compliance with EPA Regional Haze requirements, ST2 will convert to natural gas as its sole fuel source by December of 2017.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703. Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

**B-1 For each generating unit and purchased power contract:**

- m. Minimum capacity at which the generating unit would be run or power must be purchased;

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- n. Whether, under standard operating procedures, the generating unit must be run if it is available to run;

[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- o. Description of each generating unit as base load, intermediate, or peaking;

### Existing Units/Contracts

#### **Combined Cycle 1 (CC1)**

CC1 is a Combined Cycle unit consisting of Gas Turbine 1 (GT1), a natural gas-fired simple cycle GE MS5001D combustion turbine constructed in 1963 with a gross rated capacity of 10 MW. GT1 is often operated in concert with Steam Unit 1 (ST1), a natural gas-fired boiler constructed in 1963 with a gross rated capacity of 72 MW. ST1 can be operating independently or heat from the boiler burners can be supplemented by exhaust gas from GT1. Together their net rated capacity is 82 MW. Historically, this unit has served the following functions within the AEPCO generation portfolio: (i) seasonal (summer) peaking, (ii) spinning reserves and regulation during the period when the unit is on line, and (iii) reliability service for ST2 and ST3 unplanned outages. AEPCO plans to continue operating CC1 in the future for seasonal peaking.

#### **Gas Turbine 2 (GT2)**

GT2 is a simple cycle GE Frame 5N combustion turbine with a rated capacity of 20 MW and was constructed in 1972. Historically, this generation resource has been utilized by AEPCO as non-spinning reserves. Under the Western Electric Coordinating Council (WECC) and Southwest Reserve Sharing Group (SRSG) procedures, any resource designated as non-spinning for reserve calculations is off-line generation capacity that can be ramped to capacity and synchronized to the grid within ten minutes of a dispatch instruction and is used to maintain system frequency stability during emergency conditions.

[Response continues on next page.]

## **2017 Integrated 15-Year Resource Plan**

The unit start time for GT2 is approximately seven minutes. Due to AEPCO's ability to perform these quick test starts within ten minutes this unit has been an economical option to satisfy AEPCO's regulatory non-spinning requirements. AEPCO plans to continue operating GT2 into the future primarily as a non-spinning resource.

### **Gas Turbine 3 (GT3)**

GT3, constructed in 1975, is a simple cycle, natural gas-fired Westinghouse 501B2 combustion turbine with a rated capacity of 65 MW. AEPCO plans to continue operating GT3 into the future primarily for seasonal peaking.

### **Gas Turbine 4 (GT4)**

GT4 is a simple cycle, dual fuel, GE LM6000 peaking resource rated at approximately 38 MW. The unit is equipped with an SCR for NOx reduction. AEPCO plans to continue operating GT4 into the future primarily for seasonal peaking.

### **Steam Unit 2 (ST2) and Steam Unit 3 (ST3)**

ST2 and ST3 are virtually identical units commissioned in 1979 each having a net unit rating of 175 MW. Coal is the primary fuel, but the units have the ability to burn natural gas. AEPCO operates both ST2 and ST3 as load following resources to meet the resource requirements of the Class A Members. Upon the conversion of ST2 from coal to gas, it will be dispatched as an intermediate unit within AEPCO's resource portfolio.

### **SLC-IP Purchase**

The SLC-IP purchase power contract is for hydroelectric capacity which is made available on a seasonable basis and served from the dams of the Salt Lake City Integrated Projects. This capacity is typically scheduled in advance and over peak hours to maximize the energy's value.

### **Parker-Davis Purchase**

The Parker-Davis purchase power contract is for hydroelectric capacity which is made available on a seasonable basis and served from the Parker Dam and Davis Dam power projects. This capacity is typically scheduled in advance and over peak hours to maximize the energy's value.

**[Response continues on next page.]**



**2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

**B-1            For each generating unit and purchased power contract:**

- p. Environmental impacts, including air emission quantities (in metric tons or pounds) and rates (in quantities per megawatt-hour) for carbon dioxide, nitrogen oxides, sulfur dioxide, mercury, particulates, and other air emissions subject to current or expected future environmental regulation;

**[Response begins on next page.]**

## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

B-1 For each generating unit and purchased power contract:

- q. Water consumption quantities and rates;

Information is not available regarding historical water consumption as to each generating unit. For all units at Apache Station, an average of 3801 acre feet of water was used over the past five years based on metered production well output. AEPCO does not expect the amount of water usage to significantly increase as it will be transitioning one of its coal units, ST2, to gas operation.

Should AEPCO and its Members elect to pursue any additional fossil resources, the required water will be site- and unit-specific.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - a. Projected data for each of the items listed in subsection (B)(1), for each generating unit and purchased power source, including each generating unit that is expected to be new or refurbished during the period, which shall be designated as new or refurbished, as applicable, for the year of purchase or the period of refurbishment;

---

**B-1            For each generating unit and purchased power contract:**

- r. Tons of coal ash produced per generating unit;

**[Response begins on the following page.]**

## **2017 Integrated 15-Year Resource Plan**

[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - b. Projected data for each of the items listed in subsection (B)(2), for the power supply system;

---

B-2 For the power supply system;

- a. A description of generating unit commitment procedures;

### Commitment Procedures

All of AEPCO's generating units are located at Apache Generating Station (AGS). AGS consists of two coal steam units (175 MW each), one gas steam unit (72 MW) and four gas turbines ranging from 10 MW to 65 MW. In a normal year, AGS Units 2 & 3 are both on-line except during March and/or April, when one of the units is off-line for a major or minor overhaul. When Steam Units 2 & 3 are both committed, they are dispatched economically each hour. The remaining units are dispatched seasonally or daily as needed to meet load on an economic basis. If AEPCO is able to economically purchase power against the gas units, AEPCO makes economy purchases prior to starting the gas units. One such example is the Southwest Public Power Resource (SPPR PPA), which is called upon on a prescheduled, day-ahead basis.

As a preference customer, AEPCO also has contract entitlements to Parker-Davis hydro and Salt Lake City Area Integrated Projects capacity (SLC-IP) (Colorado River Storage Project hydro). These hydro contracts are AEPCO's least expensive resources and are scheduled to the extent allowed in each contract against AEPCO's loads. This tends to level the output required from Apache Station and maximize station efficiency. On occasion, AEPCO will enter into take-or-pay contracts (block purchases) that are used for fuel displacement and maintenance outage coverage.

Thus, subject to availability, the units and PPAs are generally committed in economic order against the net of load minus hydro resources and short-term economy.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - b. Projected data for each of the items listed in subsection (B)(2), for the power supply system;

---

B-2 For the power supply system;

- b. Production cost;

[Response begins on next page]



## **2017 Integrated 15-Year Resource Plan**

[Begin Confidential Information]

[Response continues on next page.]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEP CO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

[Continue Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - b. Projected data for each of the items listed in subsection (B)(2), for the power supply system;

- 
- |     |  |
|-----|--|
| B-2 | For the power supply system; <ol style="list-style-type: none"><li>c. Reserve Requirements;</li><li>d. Spinning Reserve;</li></ol> |
|-----|--|

[Response begins on next page]

**2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - b. Projected data for each of the items listed in subsection (B)(2), for the power supply system;

---

B-2 For the power supply system;

- e. Reliability of generating, transmission, and distribution systems;

[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - b. Projected data for each of the items listed in subsection (B)(2), for the power supply system;

---

---

B-2 For the power supply system;

- f. Purchase and sale prices, averaged by month, for the aggregate of all purchases and sales related to short-term contracts;

No purchases or sales pursuant to traditional short-term contracts are included in the forecast period. However, AEPCO's modeling assumes regular interaction with the local Arizona hourly energy market. The assumed pricing for these transactions is listed behind Tab C.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - b. Projected data for each of the items listed in subsection (B)(2), for the power supply system;

---

B-2 For the power supply system;

- g. Energy Losses;

Projected transmission energy losses are forecast at a network energy loss rate of 2.31% during the planning period. Loads modeled in the IRP analyses include transmission losses as well as distribution side losses based on an assessment of each Class A Member distribution cooperative.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - c. The capital cost, construction time, and construction spending schedule for each generating unit expected to be new or refurbished during the period;

---

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN AEPCO  
AND STAFF DATED MARCH 23, 2015.**



## 2017 Integrated 15-Year Resource Plan

### R14-2-703.    Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
    - d. The escalation levels assumed for each component of cost, such as, but not limited to, operating and maintenance, environmental compliance, system integration, backup capacity, and transmission delivery, for each generating unit and purchased power source;
- 

AEPCO has assumed 1.82% annual cost escalation for capital cost components, prospective PPA pricing, fixed and variable operations and maintenance costs, and known environmental chemical costs for both existing and potential generation sources. This escalation aligns with the average year-over-year inflation of the Consumer Price Index (CPI) for the past ten years of recorded data.

Other costs were projected via individual forecast or analysis, with assumptions listed behind Tab C.

## 2017 Integrated 15-Year Resource Plan

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
  - e. If discontinuation, decommissioning, or mothballing of any power source or permanent derating of any generating facility is expected:
    - i. Identification of each power source or generating unit involved;
    - ii. The costs and spending schedule for each discontinuation, decommissioning, mothballing, or derating; and
    - iii. The reasons for each discontinuation, decommissioning, mothballing, or derating;

---

AEPCO's wholesale power contracts with its Class A Members currently reflect discontinuation of operations of Apache Generating Station's CC1, GT2, and GT3 on December 31, 2020. However, as a result of discussions with its Members, AEPCO anticipates contract extensions on these units beyond 2020 through 2035. Other Apache Station units are expected to retire at the end of the current Class A Member contracts in 2035.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
    - f. The capital costs and operating and maintenance costs of all new or refurbished transmission and distribution facilities expected during the 15-year period;
- 

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN AEPCO  
AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

1. A 15-year resource plan, providing for each year:
  - g. An explanation of the need for and purpose of all expected new or refurbished transmission and distribution facilities, which explanation shall incorporate the load-serving entity's most recent transmission plan filed under A.R.S. 40-360.02(A) and any relevant provisions of the Commission's most recent Biennial Transmission Assessment decision regarding the adequacy of transmission facilities in Arizona; and

---

AEPCO has included an excerpt of its most recent Ten-Year Transmission Plan behind Tab D. This includes an explanation of the need for and purpose of all major transmission projects AEPCO is projecting.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

1. A 15-year resource plan, providing for each year:
    - h. Cost analyses and cost projections, including the cost of compliance with existing and expected environmental regulations;
- 

**[Begin Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN AEPCO  
AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information.]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN AEPCO  
AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

2. Documentation of the data, assumptions, and methods or models used to forecast production costs and power production for the 15-year resource plan, including the method by which the forecast was benchmarked;

---

In the simulation of the various scenarios which AEPCO modeled in its IRP, AEPCO utilized a capacity-expansion and production costing model, EnCompass, to perform long-range simulations of forecasted market conditions, demand requirements, system dispatch, and energy-production costs. EnCompass is a utility-centric model by Anchor Power Solutions Inc. which analyzes hundreds of resource combinations in order to recommend lowest-cost resource portfolios under defined assumptions. By varying the assumed conditions that AEPCO and its Members may face in the future, this tool assists AEPCO and its Members in making decisions which attempt to ensure low-cost, low-risk power supply for Cooperative customers.

AEPCO benchmarked its model by modeling scenarios with identical parameters between EnCompass and other models such as Planning and Risk (PaR), which ACES Power Marketing runs on AEPCO's behalf.

Included behind Tab C are the assumptions AEPCO utilized in its production cost and resource expansion modeling software.

**The information contained in the AEPCO Assumptions Documents is confidential and its use and availability is restricted pursuant to the terms of the Protective Agreement dated March 23, 2015 with Staff.**

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

3. A description of:
    - a. Each potential power source that was rejected;
    - b. The capital costs, operating costs, and maintenance costs of each rejected source;  
and
    - c. The reasons for rejecting each source;
- 

The modeling assumptions (such as costs, fuel, and type) for all resource alternatives considered can be found behind Tab C.

AEPCO's IRP studies are based on capacity expansion modeling, which forecasts energy production costs under each potential portfolio combination to select resource portfolios of lowest cost. The resource alternatives identified in AEPCO's IRP represent the variety of resource options being considered by AEPCO at this time. This analysis is ongoing, such that selection or rejection of any potential resource alternative is not and should not be construed as a binding determination.



## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

4. A 15-year forecast of self generation by customers of the load-serving entity, in terms of annual peak production (megawatts) and annual energy production (megawatt-hours);

---

AEPCO only supplies power at the wholesale level and therefore does not include information regarding end-use consumer self-generation.

At the distribution entity level, with the exception of meeting any state mandated renewable requirements, AEPCO's All-Requirements Members are contractually prohibited from self-generation and must take all of their power requirements from AEPCO. PRMs are each responsible to meet load above their allocated capacity (AC) in AEPCO resources and may use self-owned generation to do so.

AEPCO's Class A Members report their renewable generation to the Arizona Corporation Commission (ACC) annually in their Renewable Energy Standard and Tariff (REST) plans. The table below lists the recent REST filing information of AEPCO's Class A Members located in Arizona.

Member Cooperative	Date Filed	Docket #
Duncan Valley Electric Cooperative	6/30/2016	E-01703A-16-0228
Graham County Electric Cooperative	3/3/2017	E-01749A-17-0063
Mohave Electric Cooperative	7/1/2016	E-01750A-16-0230
Sulphur Springs Valley Electric Cooperative	6/1/2016	E-01575A-16-0175
Trico Electric Cooperative	6/30/2016	E-01461A-16-0229

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

5. Disaggregation of the forecast of subsection (D)(4) into two components, one reflecting the self generation projected if no additional efforts are made to encourage self generation, and one reflecting the self generation projected to result from the load-serving entity's institution of additional forecasted self generation measures;
- 

Please see response to D.4.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

6. A 15-year forecast of the annual capital costs and operating and maintenance costs of the self generation identified under subsection (D)(4) and (5);
- 

Not Applicable. Please see response provided in D.4.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

7. Documentation of the analysis of the self generation under subsections (D)(4) through (6);

---

Not Applicable. Please see prior responses.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

8. A plan that considers using a wide range of resources and promotes fuel and technology diversity within its portfolio;

---

As discussed in greater detail in part F, AEPCO's IRP analysis presents a wide variety of resource alternatives and addresses the unique considerations of AEPCO and its Members.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

9. A calculation of the benefits of generation using renewable energy resources;
- 

AEPCO considered the procurement of both utility-scale solar and wind PPAs as a large-scale resource alternative in its planning models. Pursuant to the Second IRP Order, AEPCO has provided a table showing the estimated levelized cost of each resource, as considered in AEPCO's IRP modeling. This table is located behind Tab G.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

10. A plan that factors in the delivered cost of all resource options, including costs associated with environmental compliance, system integration, backup capacity, and transmission delivery;

---

AEPCO plans to install a solar facility at Apache Station in mid-2017. AEPCO's modeling of the local transmission system showed no required mitigation measures for loss of reliability associated with this installation. Further, given the facility's adjacency to generation and the reserves already carried on Apache Station units, no further reserves were determined to be required for this project.

Given that AEPCO's analysis of the prospective resources identified in the IRP is ongoing, the evaluation does not yet include detailed cost information because it is assumed that placement of prospective resources will be adjacent to AEPCO's existing transmission system and the costs of system integration and delivery are de minimus. Before moving forward with any resource option, these costs, specific to the project in question, will be analyzed in depth.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

11. Analysis of integration costs for intermittent resources;

---

See response provided in D.10.



## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

12. A plan to increase the efficiency of the load-serving entity's generation using fossil fuel;

---

---

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

13. Data to support technology choices for supply-side resources;

---

Because AEPCO delivers power at wholesale, it does not include any new supply-side resources at this time, and no technology choices are being made.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

14. A description of the demand management programs or measures included in the 15-year resource plan, including for each demand management program or measure:
  - a. How and when the program or measure will be implemented;
  - b. The projected participation level by customer class for the program or measure;
  - c. The expected change in peak demand and energy consumption resulting from the program or measure;
  - d. The expected reduction in environmental impacts, including air emissions, solid waste, and water consumption, attributable to the program or measure;
  - e. The expected societal benefits, societal costs, and cost-effectiveness of the program or measure;
  - f. The expected life of the measure; and
  - g. The capital costs, operating costs, and maintenance costs of the measure, and the program costs;

---

AEPCO supplies no power at retail and, therefore, has not included demand management programs or measures.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703. Load-serving Entity Reporting Requirements**

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

15. For each demand management measure that was considered but rejected:
  - a. A description of the measure;
  - b. The estimated change in peak demand energy consumption from the measure;
  - c. The estimated cost-effectiveness of the measure;
  - d. The capital costs, operating costs, and maintenance costs of the measure, and the program costs; and
  - e. The reasons for rejecting the measure;

---

See the response to D.14.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:

#### 16. Analysis of future fuel supplies that are part of the resource plan; and

---

AEPCO's generation is connected to the El Paso Natural Gas (EPNG) Southern System pipelines, which are located in immediate proximity to the Apache Generation Station. AEPCO has approximately 21,000 Dth of firm transportation in the winter months and approximately 33,000 Dth of firm transportation in the summer months. AEPCO also has 95,000 Dth of firm storage from Chevron Keystone Gas Storage, LLC, owned and operated by Chevron Pipe Line Company, located in Kermit Texas. The maximum daily injection quantity is 2,500 Dths and the maximum daily withdrawal quantity is 5,000 Dth per day.

AEPCO uses the transportation agreements to transport natural gas from the San Juan and Permian basins to Apache Station and uses the gas storage agreement to meet the hourly and daily balancing requirements on the EPNG Pipeline. Forecasts from these hubs were utilized to project AEPCO's natural gas fuel costs. The forecasts utilized in AEPCO's IRP scenarios were developed by PACE Global and S&P Global, industry experts in commodity price forecasting. These forecasts are detailed both in part F and behind Tab C.

In November 2011, AEPCO received a decision from the STB in its transportation rate case filed at the end of 2008 whereby AEPCO received a ten year rate prescription (2009-2018) for coal transportation from various coal supply origins on the BNSF Railway (BNSF) in New Mexico, Wyoming and Montana. Since that time, AEPCO has developed a strategy for future coal supply and rail transportation, including contracts for various coal supply origins on the Union Pacific Railroad (UP) in Wyoming and Colorado.

AEPCO will continue to analyze anticipated EPA impacts on its coal unit operations in the future and to adjust coal purchases and blends as needed to meet standards. Testing and analysis is ongoing to determine the optimum coal blend and chemical combination for meeting environmental standards on its coal units.

**[Response continues on next page.]**

## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703.    Load-serving Entity Reporting Requirements

**D.) A load-serving entity shall, by April 1 of each even year, file with Docket Control the following prospective analyses and plans, which shall compare a wide range of resource options and take into consideration expected duty cycles, cost projections, other analyses required under this Section, environmental impacts, and water consumption and may include a reference to the last filing made under this subsection for each item for which there has been no change since the last filing:**

17. A plan for reducing environmental impacts related to air emissions, solid waste, and other environmental factors, and for reducing water consumption.
- 

Apache Station is currently a zero liquid discharge facility and will maintain that status while continuing to focus on increasing process water reuse plant-wide.

AEPCO continues to employ good air pollution control practices in operating its Apache Station pollution control equipment. AEPCO maintains compliance with emission limits for total particulates, sulfur dioxide, nitrogen oxides and mercury as per its air quality control permit.

In April 2016, AEPCO met the conditions of the MATS rule on ST2 and ST3 by utilizing the existing calcium bromide application with the addition of an activated carbon injection (ACI) to oxidize mercury in the flue gas.

In 2017, AEPCO is preparing to meet its Regional Haze obligation, which requires the installation of SNCR on ST3 and the conversion to pipeline natural gas on ST2.

AEPCO has been working to comply with the new Federal Coal Combustion Residue (CCR) rule to maintain operation of its surface impoundments. These requirements include the addition of monitoring wells, sampling, analyzing and publication of data on its public website.

Finally, as previously discussed, there is significant uncertainty regarding the future implications of carbon dioxide regulation. AEPCO continues to monitor these developments.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:
  - a. Demand forecasts;

---

The six scenarios which AEPCO modeled in its IRP used the aggregate base case load forecast for all of its Class A Members. The base case load forecast represents the most likely forecast of electric demand. This base case assumes a medium expectation of local economic development, as well as average weather patterns.

As required by RUS, AEPCO also studies sensitivities to the load forecast, including low and high economic conditions and low and high weather conditions, creating a range of potential forecasts of peak demand and energy requirements. For the weather and economic bands generated around the base cases, the forecast models assume more extreme values for the weather or economic variables included in the regression equation. The bands assume constant upper and lower bounds around the base case, reflecting higher and lower loads due to either optimistic or pessimistic conditions. The purpose of evaluating these scenarios is to provide a set of forecasts that bound a range of plausible futures based upon weather and economic related influences—each of which are possible, but not assured.

**[Response continues on next page.]**



## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

By planning for the most likely electric demand rather than a higher demand, AEPCO believes it is taking a conservative view that limits its potential investments to those most likely to yield cost benefits to its customers.

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:
  - b. The costs of demand management measures and power supply;

---

AEPCO serves power only at wholesale and so has not included any demand management programs. As discussed in E.1.a., AEPCO does perform a sensitivity analysis of aggregated Member forecasts which should reflect demand side risks.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:
  - c. The availability of sources of power;

---

AEPCO considered both new build natural gas and renewable generation sources, as well as the potential to acquire a portion of an existing Natural Gas Combined Cycle (NGCC) asset from the Arizona market. AEPCO maintains contact with a variety of engineering and development firms which are involved in the design and construction of new-build assets, including those involved in the marketing of renewable Purchased Power Agreements (PPA). Based on this correspondence, AEPCO concludes that, provided adequate time for project development, very little risk exists regarding the availability of new-build gas assets. For the 7FA NGCC options assumed in AEPCO's IRP modeling, AEPCO has assumed co-ownership of these units in conjunction with another utility or asset owner. Considering the size of these larger NGCC units, if AEPCO and its Members elect to pursue one of these assets, they will be required to identify a suitable partner.

**[Begin Confidential Information]**

**[End Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

**[Response continued from previous page.]**

The situation concerning availability of renewable PPAs from new-build renewables is similar to that of gas assets. With respect to solar PPAs, large numbers of developers exist and utility-scale solar can be cited near to transmission infrastructure. The execution of wind PPAs is possible, but more challenging, given AEPCO's location and the nearby wind resource. Therefore, while AEPCO has developed reasonable modeling assumptions for nearby wind resources, the energy costs and transmission costs associated with delivery of this power may require further study before committal.

While AEPCO has endeavored to include a sufficiently wide breadth of resource alternatives in its IRP modeling, there may be sources of power which have not been considered because they are not yet commercially viable or economically advantageous, or simply because they have not yet become readily available. AEPCO and its Members will continue to stay abreast of market developments and power supply opportunities, including new technologies and potential power purchase options which may allow for more gradual capacity procurement or other advantages.

## **2017 Integrated 15-Year Resource Plan**

R14-2-703. Load-serving Entity Reporting Requirements

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:
  - d. The costs of compliance with existing and expected environmental regulations;

---

**[Begin Confidential Information]**

**[End Confidential Information]**

Finally, a discussion of the risks associated with potential carbon regulation is included in part E.1.e.

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703. Load-serving Entity Reporting Requirements**

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:
  - e. Any analysis by the load-serving entity in anticipation of potential new or enhanced environmental regulations;

---

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:
  - f. Changes in fuel prices and availability;

---

Resources are selected by AEPCO's models based on a combination of capacity needs and energy production cost savings. To the extent that a resource decision is based upon market forecasts and projected energy cost savings, investment or non-investment in certain assets may involve differing levels of market price risk.

Natural gas prices in years past have experienced significant price volatility, making the future of gas prices difficult to forecast. To address this price risk, AEPCO utilized three differing natural gas forecasts in its IRP scenario analyses. These were developed by PACE Global and S&P Global, both experts in commodity forecasting. These entities take into account pipeline and wellhead gas availability in conjunction with forecasted demand to predict appropriate pricing including the potential for scarcity.

AEPCO utilized a similar approach in its electric market forecasts to that of its natural gas forecasts. The first four scenarios of AEPCO's IRP modeling utilize electric market prices developed by PACE Global. The fifth and sixth scenarios utilize the historical market heatrate in conjunction with gas prices from S&P Global to forecast the Arizona power market. The power market is correlated to the natural gas market, and therefore, like natural gas, is highly volatile. Similar to AEPCO's approach with natural gas, AEPCO has attempted to address this price risk by utilizing a variety of forecasts in its planning.

Regarding AEPCO's coal forecast, AEPCO began operation of its coal blending facility in 2004 which allows significant operational flexibility in types and qualities of coal burned. In addition, the November 22, 2013 Surface Transportation Board (STB) ruling in favor of AEPCO on equitable rates from rail carriers has significantly increased supply flexibility. The effect of this ruling and AEPCO's ability to blend coal supply has been to open new coal markets for AEPCO which has helped stabilize long term coal fuel costs for Apache Generating Station. This minimizes the price risk for AEPCO on coal procurement.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

1. Analyses to identify and assess errors, risks, and uncertainties in the following, completed using methods such as sensitivity analysis and probabilistic analysis:
  - g. Construction costs, capital costs, and operating costs; and

---

AEPCO's assumptions for its potential resource alternatives were procured from a combination of industry experts and recent known transaction pricing.

For AEPCO's new build gas units, AEPCO utilized the assumptions provided in the Apache Station Study by Burns and McDonnell, a nationally recognized engineering consulting firm. The new build capital and Operations & Maintenance (O&M) cost values were inflated to present dollars using the actual historical inflation rate.

**[Response continues on next page.]**



## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[Response continues on next page.]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Continue Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**E.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a compilation of the following analyses and plan:**

2. A description and analysis of available means for managing the errors, risks, and uncertainties identified and analyzed in subsection (E)(1), such as obtaining additional information, limiting risk exposure, using incentives, creating additional options, incorporating flexibility, and participating in regional generation and transmission projects; and
3. A plan to manage the errors, risks, and uncertainties identified and analyzed in subsection (E)(1).

---

Through AEPCO's normal regional planning activities, AEPCO evaluates options and flexible opportunities to limit risk exposure and will pursue additional options as needed by participation in regional generation and transmission projects. As discussed in prior responses, AEPCO has used best efforts to minimize the various risks mentioned via statistical analysis, benchmarking with other sources, and internal analyses of relevant costs.

Additionally, AEPCO will continue to monitor the forward pricing for its costs including coal and natural gas. Specifically, on an ongoing basis, AEPCO coordinates both internally and with external entities including ACES Power Marketing to identify risks and develop hedging strategies as needed to limit exposures.

## 2017 Integrated 15-Year Resource Plan

### R14-2-703. Load-serving Entity Reporting Requirements

**F.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a 15-year resource plan that:**

1. Selects a portfolio of resources based upon comprehensive consideration of a wide range of supply- and demand-side options;
2. Will result in the load-serving entity's reliably serving the demand for electric energy services;
3. Will address the adverse environmental impacts of power production;
4. Will include renewable energy resources to meet or exceed the greater of the Annual Renewable Energy Requirement in R14-2-1804 or the following annual percentages of retail kWh sold by the load-serving entity:

Calendar Year	Percentage of Retail kWh Sold During Calendar Year
2010	2.5%
2011	3.0%
2012	3.5%
2013	4.0%
2014	4.5%
2015	5.0%
2016	6.0%
2017	7.0%
2018	8.0%
2019	9.0%
2020	10.0%
2021	11.0%
2022	12.0%
2023	13.0%
2024	14.0%
After 2024	15.0%

5. Will include distributed generation energy resources to meet or exceed the greater of the Distributed Renewable Energy Requirement in R14-2-1805 or the following annual percentages as applied to the load-serving entity's Annual Renewable Energy Requirement:

2007	5%
2008	10%
2009	15%
2010	20%
2011	25%
After 2011	30%

6. Will address energy efficiency so as to meet any requirements set in rule by the

## 2017 Integrated 15-Year Resource Plan

- Commission or in an order of the Commission;
7. Will effectively manage the uncertainty and risks associated with costs, environmental impacts, load forecasts, and other factors;
  8. Will achieve a reasonable long-term total cost, taking into consideration the objectives set forth in subsections (F)(2) through (7) and the uncertainty of future costs; and

### Overview of AEPCO Planning Scenarios and Methodology

AEPCO's position as a load serving entity is unique within the State of Arizona. AEPCO provides wholesale generation and transmission service predominantly to its six Class A Members. In light of recent and potential future developments in both the local Arizona energy market as well as government regulation of CO<sub>2</sub> from existing fossil units, AEPCO has included six planning scenarios in its modeling.

The scenarios considered by AEPCO are summarized in the table below, and differ from one another in three primary areas:

1. Assumptions for the Clean Power Plan
2. Assumptions for the Gas/Electric Markets
3. The Member demand required to be served by AEPCO

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
1	Base Case - No Carbon Tax	Full Load	All Member Demand	No CPP	N/A	Pace Base	Pace Base - No CPP
2	State Rate CPP	Full Load	All Member Demand	State Rate	PACE - Base CPP	Pace Base	Pace Base - State Rate CPP
3	State Rate CPP - High Regulatory	Full Load	All Member Demand	State Rate	High	Pace High	Pace High - State Rate CPP
4	Subcategory Rate CPP - High Regulatory	Full Load	All Member Demand	Subcategory Rate	High	Pace High	Pace High - SubCategory Rate CPP
5	Low Gas Price - No CPP	Full Load	All Member Demand	No CPP	N/A	SNL/S&P Global	SNL Gas/Historical HR
6	BAU Case (Low Gas Price - Existing AC Obligation)	Full Load	Current AC	No CPP	N/A	SNL/S&P Global	SNL Gas/Historical HR

\*All scenarios were modeled with AEPCO Members' full load and resources for production costing, but vary between All Member Demand and current Allocated Capacity (AC) for the purpose of capacity expansion modeling.

In its IRP, AEPCO utilized a capacity-expansion and production costing model, EnCompass, to perform long-range simulations of forecasted market conditions, demand requirements, system dispatch, and energy-production costs. EnCompass is a utility-centric model by Anchor Power Solutions Inc., which analyzes hundreds of resource combinations in order to recommend lowest-

## **2017 Integrated 15-Year Resource Plan**

cost resource portfolios that satisfy the peak demand obligations of the Cooperative load. By varying the assumed futures AEPCO and its Members may face, this tool assists AEPCO and its Members in making decisions aimed at low-cost, low-risk, reliable power supply for Cooperative customers.

Consistent with the 2014 Apache Station Study, part of AEPCO's analysis requires that the coincident peak demand of AEPCO's Class A Members be covered by firm resources of some kind. For Scenarios 1-5, AEPCO has forecast resource procurement strategies to serve all Member demand with physical capacity, except for the top 10% of annual demand, which may be met by firm purchases from the local energy market. For Scenario 6, AEPCO has forecast resource procurement strategies for the full demand of AEPCO's ARMs, but has not assumed any obligation to plan to meet future capacity needs of AEPCO's PRMs beyond their current AC in AEPCO's units.

AEPCO does not have an obligation to plan for its Partial Requirements Members (PRMs), who may procure generation from sources beyond AEPCO, including independent procurement of power purchase contracts and resources. As a result, AEPCO's IRPs historically addressed only the resource needs of the All-Requirements Members. However, given the recent changes in both local and national energy markets, AEPCO's Class A Members (including the PRMs) agreed to an expanded IRP evaluating the possibility of additional resources to serve all Members. Because this joint planning does not obligate AEPCO's Members to select a particular course of action or resource plan, AEPCO has elected to show results for all six scenarios, rather than to select a particular resource plan as a preferred option.

### **Renewable Energy Distributed Generation, and Energy Efficiency**

In response to parts F.4, F.5, and F.6, AEPCO is not subject to the referenced rules or requirements. *See* First IRP Order, Finding 5. AEPCO's Arizona Class A Members do supply power at retail and annually submit renewable plans for approval by the Commission pursuant to R14-2-1814. Upon Commission approval of those plans, their provisions substitute for the requirements of Rules 1804 and 1805.

## 2017 Integrated 15-Year Resource Plan

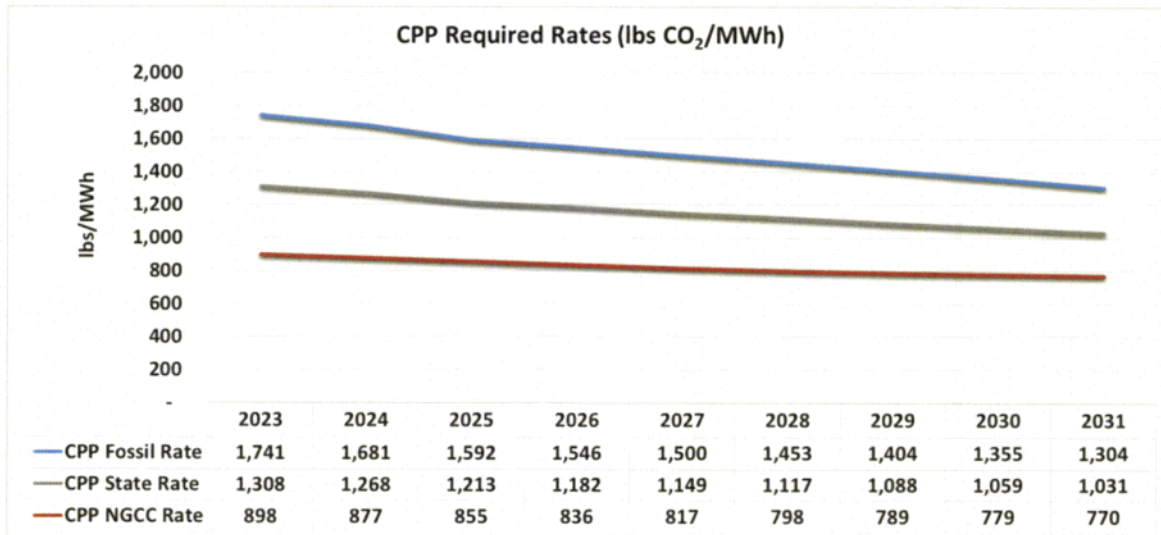
### Modeling of the Clean Power Plan & Energy Markets

In light of the Stay issued by the Supreme Court in 2016 on the Clean Power Plan regulations as well as the change in EPA leadership, the uncertainty regarding the future of the CPP is significant. Nevertheless, in lieu of better information, AEPCO modeled the Clean Power Plan in a manner generally consistent with EPA's 2015 final rule. However, given the Stay and the relative uncertainty of the CPP, AEPCO assumed the CPP would begin in 2023, rather than EPA's proposed date of 2022.

As shown in the prior scenario summary table, AEPCO assumed two types of potential state implementation plan for the Arizona:

- i) The State Rate plan, which assesses a common CO<sub>2</sub> emission rate (in lbs/MWh) requirement for all affected units under 111(d) (included in Scenarios 2 and 3).
- ii) The Subcategory Rate plan, which assesses a lower required emission rate for NGCC units and a higher rate for all other affected fossil units (included in Scenario 4).

The graph below shows the required emission rate standards, including the assumed 2023 start date.



Under both the State Rate and Subcategory Rate plans, affected generating units would be able to procure Emission Rate Credits (ERCs) to lower their emission rate under the rule. AEPCO's modeling forecasts the net number of ERCs and the resulting total ERC cost in order for AEPCO and its Members to comply with the CPP. AEPCO has worked with its Members to forecast the number of renewables and energy efficiency MWh that would likely generate ERCs under the CPP. These ERCs have been netted against the gross number required for compliance to derive the *net* compliance cost. Detail on the ERC assumed is included in AEPCO's assumptions, behind Tab C.



## **2017 Integrated 15-Year Resource Plan**

AEPCO worked with its consultant, PACE Global, to forecast the likely pricing of natural gas, electric, and ERC compliance instruments. PACE performed this pricing analysis utilizing two different assumptions regarding future regulatory atmosphere (i.e. Base-Case versus High Regulatory futures). The forecasted pricing of ERCs is shown below.

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**



## **2017 Integrated 15-Year Resource Plan**

PACE also provided assumptions for natural gas and electric market prices for scenarios both with and without the CPP (Scenarios 1 through 4). For Scenarios 5 and 6, AEPCO utilized a hybrid pricing approach with the natural gas forecast from S&P Global and the electric forecast derived from the historical market heatrate, or historical relationship between the natural gas and Arizona electric markets. The Scenario 5 and 6 forecast assumes no CPP and predicts market prices to remain relatively low into the future. The gas price and electric price forecasts utilized in AEPCO's modeling are shown below.

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

### **Resource Assumptions & Potential Alternatives**

Given the expanded nature of this IRP, assumed existing resources included AEPCO existing and planned resources (i.e., Apache Station units, PPAs, and the 2017 solar installation) as well as resources owned or contracted by AEPCO's Members directly. Non-AEPCO resources are listed in AEPCO's modeling assumptions behind Tab C.

In determining which resource options to include, AEPCO focusing on identifying realistic options to best serve the needs of its Members. These alternatives are summarized below and include both natural gas and renewable generation options.

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

### **Results of AEPCO's Integrated Resource Planning Modeling**

AEPCO's scenario modeling produced the following results, detailed by individual scenario. For each scenario, AEPCO has reported basic assumptions about the scenario, the future resource selections which AEPCO's planning model selected, details regarding generation and load service, costs, and where applicable, information regarding AEPCO's compliance with the modeled CPP. This information is generally presented graphically. Further numerical detail on these results may be viewed behind Tab F.

AEPCO has also included behind Tab F modeling results from further sensitivity work in which only new-build resource alternatives were considered.

**The results provided on subsequent pages are competitively confidential and, as such, are protected by the Protective Agreement between AEPCO and Staff dated March 23, 2015.**

**2017 Integrated 15-Year Resource Plan****Scenario 1: *Base Case - No Carbon Tax***Scenario Assumptions:

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/ Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
1	Base Case - No Carbon Tax	Full Load	All Member Demand	No CPP	N/A	Pace Base	Pace Base - No CPP

**[Begin Confidential Information]****[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEP CO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

Clean Power Plan Compliance Metrics:

Not Applicable for this scenario.

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### Scenario 2: State-Rate Clean Power Plan

#### Scenario Assumptions:

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/ Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
2	State Rate CPP	Full Load	All Member Demand	State Rate	PACE - Base CPP	Pace Base	Pace Base - State Rate CPP

[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**



**2017 Integrated 15-Year Resource Plan****Scenario 3: State-Rate Clean Power Plan, High CO2 Compliance Cost****Scenario Assumptions:**

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/ Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
3	State Rate CPP - High Regulatory	Full Load	All Member Demand	State Rate	High	Pace High	Pace High - State Rate CPP

**[Begin Confidential Information]****[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEP CO AND STAFF DATED MARCH 23, 2015.**

**2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### Scenario 4: Subcategory-Rate Clean Power Plan, High CO2 Compliance Cost

#### Scenario Assumptions:

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
4	Subcategory Rate CPP - High Regulatory	Full Load	All Member Demand	Subcategory Rate	High	Pace High	Pace High - Subcategory Rate CPP

[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

**2017 Integrated 15-Year Resource Plan**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

**2017 Integrated 15-Year Resource Plan****Scenario 5: Prolonged Low Gas Prices, No CPP****Scenario Assumptions:**

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
5	Low Gas Price - No CPP	Full Load	All Member Demand	No CPP	N/A	SNL/S&P Global	SNL Gas/Historical HR

**[Begin Confidential Information]****[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

Clean Power Plan Compliance Metrics:

Not Applicable for this scenario.

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated 15-Year Resource Plan

### Scenario 6: Prolonged Low Gas Prices, AEPCO to Serve Only Current AC

#### Scenario Assumptions:

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
6	BAU Case (Low Gas Price - Existing AC Obligation)	Full Load	Current AC	No CPP	N/A	SNL/S&P Global	SNL Gas/Historical HR

[Begin Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated 15-Year Resource Plan**

Clean Power Plan Compliance Metrics:

Not Applicable for this scenario.

**[Begin Confidential Information]**

Cost Summary (\$000):

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**



## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**F.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a 15-year resource plan that:**

9. Contains all of the following:

- a. A complete description and documentation of the plan, including supply and demand conditions, availability of transmission, costs, and discount rates utilized;
- 

Please see prior responses for description of supply options, demand conditions, market conditions, and results.

Given the nature of this IRP and the locationally diverse nature of AEPCO's wholesale customers, transmission constraints have been assumed as non-binding.

AEPCO has utilized a 5.0% discount rate, both in its resource options and in its assessment of net-present-value production expenses.

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**F.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a 15-year resource plan that:**

9. Contains all of the following:

b. A comprehensive, self-explanatory load and resources table summarizing the plan;

---

Whereas AEPCO is not selecting a particular resource plan as part of its IRP submission, the following pages contain a load and resources table for AEPCO's existing obligations, as well as the modeling firm capacity additions for the six scenarios considered.

**[Response continues on next page.]**

**2017 Integrated Resource Planning Actual Data Filing**

[Begin Confidential Information]

[Confidential Information continues on next page.]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEP CO AND STAFF DATED MARCH 23, 2015.**

**2017 Integrated Resource Planning Actual Data Filing**

[Continue Confidential Information]

[End Confidential Information]

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED PURSUANT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEP CO AND STAFF DATED MARCH 23, 2015.**

## 2017 Integrated Resource Planning Actual Data Filing

### R14-2-703. Load-serving Entity Reporting Requirements

F.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a 15-year resource plan that:

9. Contains all of the following:

c. A brief executive summary;

### Description of IRP Scenarios Modeled:

AEPCO has an obligation to provide resource planning only on behalf of its Class A All-Requirements Members (ARMs); it does not have an obligation to plan for its Partial Requirements Members (PRMs), who may procure generation from sources beyond AEPCO, including independent procurement of power purchase contracts and resources. As a result, AEPCO's IRPs historically addressed only the resource needs of the ARMs. However, given the recent changes in both local and national energy markets and challenges associated with the Clean Power Plan (CPP), AEPCO's Class A Members (including the PRMs) agreed to an expanded IRP evaluating the possibility of additional resources to serve all Members. The views presented in AEPCO's IRP do not necessarily reflect the planning views of AEPCO's PRMs and will not obligate those Members to procure any resources identified in the IRP. Nevertheless, AEPCO's IRP analyses are intended to inform both the Commission and AEPCO's Members as to potential resource direction and potential means of compliance with the CPP.

The six scenarios which AEPCO has considered in its IRP analyses are summarized in the table below.

Scenario No.	Scenario Description	Load Forecast for Dispatch Modeling	Demand Forecast for Capacity Planning*	Clean Power Plan Assumption/Structure	ERC Price for Clean Power Plan	Gas Price Forecast	Electric Price Forecast
1	Base Case - No Carbon Tax	Full Load	All Member Demand	No CPP	N/A	Pace Base	Pace Base - No CPP
2	State Rate CPP	Full Load	All Member Demand	State Rate	PACE - Base CPP	Pace Base	Pace Base - State Rate CPP
3	State Rate CPP - High Regulatory	Full Load	All Member Demand	State Rate	High	Pace High	Pace High - State Rate CPP
4	Subcategory Rate CPP - High Regulatory	Full Load	All Member Demand	Subcategory Rate	High	Pace High	Pace High - SubCategory Rate CPP
5	Low Gas Price - No CPP	Full Load	All Member Demand	No CPP	N/A	SNL/S&P Global	SNL Gas/Historical HR
6	BAU Case (Low Gas Price - Existing AC Obligation)	Full Load	Current AC	No CPP	N/A	SNL/S&P Global	SNL Gas/Historical HR

\*All scenarios were modeled with AEPCO Members' full load and resources for production costing, but vary between All Member Demand and current Allocated Capacity (AC) for the purpose of capacity expansion modeling.

---

**2017 Integrated Resource Planning Actual Data Filing**

---

These scenarios are designed to represent a variety of potential energy market future environments.

- Scenario 1 represents a “base case” view of the future, in which no carbon tax exists and environmental and industrial regulation proceed at its current rate. Gas prices and electric prices rise quickly in the near term, but increase by 4-6% annually in the 2020-2030 timeframe.
- Scenario 2 mirrors the atmosphere of Scenario 1, except that it assumes a State-Rate implementation of the Clean Power Plan is implemented in 2023. Due in part to Arizona’s renewable penetration, CO2 emission rate credits (ERCs) are assumed relatively affordable.
- Scenario 3 represents the emergence of more stringent Clean Power Plan in which, particularly in later years, the price of ERCs is relatively high.
- Scenario 4 assumes an increase in the price of ERCs as well as a State Subcategory implementation of the Clean Power Plan.
- Scenario 5 has no carbon tax, and assumes that both electric prices and gas prices stay relatively low for the forecast period. Market heatrates, the relationship between the local natural gas and electric market, are assumed in this scenario to remain consistent with recent history.
- Scenario 6 is similar to Scenario 5, but eliminates the assumption of any capacity-planning by AEPCO for the PRMs above their current allocated capacity in AEPCO’s existing units, and new resources are only recommended if they show a material cost savings.

AEPCO analyzed a number of resource alternatives and market sensitivities in its IRP modeling work. AEPCO has attempted to minimize the future risks associated with natural gas, electric market, and future carbon market prices by considering a variety of sensitivities in its planning studies. AEPCO has also compared its resource assumptions against a variety of sources, in an effort to obtain reasonable estimates of resource procurement costs. Nevertheless, certain risks regarding resource availability, pricing, available transmission, and future market developments will inevitably exist. AEPCO and its Members will continue to stay abreast of market developments and power supply opportunities, including new technologies and potential power purchase options which may benefit cooperative electric customers.

**2017 Integrated Resource Planning Actual Data Filing**

**[Begin Confidential Information]**

**[End Confidential Information]**

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**

## **2017 Integrated Resource Planning Actual Data Filing**

### **General Conclusions:**

The results of AEPCO's IRP studies suggest the following conclusions:

**[Begin Confidential Information]**

**[End Confidential Information]**

2. Under certain market conditions and carbon-tax futures, the installation or contracting of additional renewable resources may reduce future energy procurement costs and hedge against future carbon regulation and carbon market exposure.
3. In the Clean Power Plan cases studied, AEPCO was able to comply with a State Rate-based CPP by a combination of existing unit re-dispatch, purchase of gas generation, renewable development, and market purchases of CO<sub>2</sub> compliance instruments (Emission Rate Credits, or ERCs).
4. Consistent with AEPCO's historical IRP analyses, under the scenario in which AEPCO does not include the capacity needs of its PRMs, the gas and electric market remains favorable, and no carbon tax is enacted, AEPCO's modeling identified that the lowest energy production cost is achieved via no resource procurements.

**THIS PAGE CONTAINS CONFIDENTIAL INFORMATION PROTECTED  
PURSUANT TO THE PROTECTIVE AGREEMENT BETWEEN  
AEPCO AND STAFF DATED MARCH 23, 2015.**



**2017 Integrated Resource Planning Actual Data Filing**

**R14-2-703.    Load-serving Entity Reporting Requirements**

**F.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a 15-year resource plan that:**

9. Contains all of the following:

d. An index to indicate where the responses to each filing requirement of these rules can be found; and

---

Please see pages iii through viii, near the front of AEPCO's IRP submission, for the index of responses.

## 2017 Integrated Resource Planning Actual Data Filing

### R14-2-703. Load-serving Entity Reporting Requirements

**F.) A load-serving entity shall, by April 1 of each even year, file with Docket Control a 15-year resource plan that:**

9. Contains all of the following:

e. Definitions of the terms used in the plan.

Abbreviation	Description
AC	Allocated Capacity
ACC	Arizona Corporation Commission
ACI	Activated Carbon Injection
ADEQ	Arizona Department of Environmental Quality
AGS	Apache Generating Station
AHP	Available Hydro Power
ARM	All Requirements Member
Anza	Anza Electric Cooperative, Inc.
AEP	Arizona Electric Power Cooperative, Inc.
BART	Best Available Retrofit Technology
BNSF	Burlington Northern and Santa Fe Railway
CARM	Collective All Requirements Member(s)
CAA	Clean Air Act
CC1	Combined Cycle 1
CCGT	Combined Cycle Gas Turbine
CCR	Coal Combustion Residuals
CO2	Carbon Dioxide
CPI	Consumer Price Index
CPP	Clean Power Plan
CROD	Contract Rate of Delivery
Duncan	Duncan Valley Electric Cooperative, Inc.
EIA	Energy Information Administration
EIM	Energy Imbalance Market
EMS	Energy Management System
ERC	Emission Rate Credit
EPA	Environmental Protection Agency
EPNG	El Paso Natural Gas
FIP	Federal Implementation Plan
Graham	Graham County Electric Cooperative, Inc.
GT1	Gas Turbine 1
GT2	Gas Turbine 2
GT3	Gas Turbine 3
GT4	Gas Turbine 4
MATS	Mercury and Air Toxics Rule
Mohave/MEC	Mohave Electric Cooperative, Inc.

## 2017 Integrated Resource Planning Actual Data Filing

Abbreviation	Description
NAAQS	National Ambient Air Quality Standards
NGCC	Natural Gas Combined Cycle
NO <sub>x</sub>	Oxides of Nitrogen
O&M	Operations and Maintenance
PRM	Partial Requirements Member
PPA	Purchase Power Agreement
PV ICE	Palo Verde Intercontinental Exchange
RACT	Reasonably Available Control Technology
REST	Renewable Energy Standard and Tariff
RFI	Request for Information
RFP	Request for Proposal
RUS	Rural Utilities Service
SAT	Single Axis Tracking
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SLC-IP	Salt Lake City Area Integrated Project
SNCR	Selective Non-Catalytic Reduction
SoCal	Southern California
SO <sub>2</sub>	Sulfur Dioxide
SPPR	Southwest Public Power Resource
SRP	Salt River Project and Power District
SMSG	Southwest Reserve Sharing Group
STB	Surface Transportation Board
ST1	Steam Turbine 1
ST2	Steam Turbine 2
ST3	Steam Turbine 3
Sulphur/SSVEC	Sulphur Springs Valley Electric Cooperative, Inc.
Trico	Trico Electric Cooperative, Inc.
UP	Union Pacific
WECC	Western Electricity Coordinating Council

## **2017 Integrated 15-Year Resource Plan**

### **R14-2-703.    Load-serving Entity Reporting Requirements**

**H.) With its resource plan, a load-serving entity shall include an action plan, based on the results of the resource planning process, that:**

1. Includes a summary of actions to be taken on future resource acquisitions;
  2. Includes details on resource types, resources capacity, and resource timing; and
  3. Covers the three-year period following the Commission's acknowledgment of the resource plan.
- 

AEPCO's planning obligation is limited to the needs of its All-Requirements Members, which currently do not indicate a near-term need for resource procurement. However, AEPCO and its Class A Members will continue to monitor load forecasts, resource needs, and market developments, and will continue to evaluate the resource options identified in the IRP.

Over the next three years, AEPCO plans:

- To install, circa July of 2017, a 15-20MW solar facility at Apache Station.
- To explore the potential for AEPCO to diversify its generation portfolio through acquisition of efficient natural gas generation, potentially through partnership with another utility, owner, or energy offtaker.
- To continue exploring renewable development and other emerging technologies for the benefit of cooperative customers.
- To continue analyses and monitor development of the CPP and other potential carbon regulations, and consider resource procurement decisions in light of those potential regulations.

Further, AEPCO and its Members are exploring whether participation in the California Energy Imbalance Market (EIM) or another structured market may be beneficial to cooperative electric consumers.

## **2017 Integrated 15-Year Resource Plan**

### **List of Information Included in Tabs/Appendices**

Tab A – AEPCO 2016 Load Forecast Report

Tab B – AEPCO Capital Plan for Generation Projects

Tab C – Modeling Assumptions for AEPCO IRP Studies

Tab D – Excerpt of AEPCO 10-yr Transmission Plan: Description of Planned Projects

Tab E – Projected Emission Quantities from Modeling Scenarios

Tab F – Additional Numerical Results and AEPCO Modeling Sensitivities

Tab G – Supplemental Analysis regarding LCOE & Battery Storage



**Tab A – AEPCO 2016 Load Forecast Report**

**THE PAGES BEHIND THIS TAB CONTAIN CONFIDENTIAL  
INFORMATION PROTECTED PURSUANT TO THE PROTECTIVE  
AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**

\*\*

*THE INFORMATION BEHIND THIS TAB HAS BEEN REDACTED, SUBJECT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.*

\*\*



**Tab B – AEPCO Capital Plan for Generation Projects**

**THE PAGES BEHIND THIS TAB CONTAIN CONFIDENTIAL  
INFORMATION PROTECTED PURSUANT TO THE PROTECTIVE  
AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**



\*\*

*THE INFORMATION BEHIND THIS TAB HAS BEEN REDACTED, SUBJECT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.*

\*\*

**Tab C – Modeling Assumptions for AEPCO IRP Studies**

**THE PAGES BEHIND THIS TAB CONTAIN CONFIDENTIAL  
INFORMATION PROTECTED PURSUANT TO THE PROTECTIVE  
AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**

\*\*

*THE INFORMATION BEHIND THIS TAB HAS BEEN REDACTED, SUBJECT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.*

\*\*



**Tab D – Excerpt of AEPCO 10-yr Transmission Plan:  
Description of Planned Projects**



## CHANGES FROM 2016 TEN-YEAR PLAN FILING

On November 9, 2016, AEPCO's Board of Directors approved the 2017-2020 Construction Work Plan (CWP). The CWP identified a number of projects that will be included in this year's Ten-Year Plan as planned projects. Projects that have projected in-service dates outside of the current CWP window but still have a high likelihood of being constructed are also included as planned projects. Additional projects that have a higher degree of uncertainty and no firm in-service dates are included as "Additional Projects Under Consideration."

## PLANNED PROJECTS

**APS Bagdad Interconnection Project.** The project expands AEPCO's Bagdad Interconnect substation by installing a used 115/69 kV transformer and connecting it to APS' Bagdad substation via a new 115 kV line. This connection will provide mutual backup for APS loads in the town of Bagdad, and Mohave Electric Cooperative's Inc. (MEC) loads west of Bagdad. AEPCO and APS are currently discussing project configuration and cost allocations for this project. The driving factor for this project is reliability for both APS and MEC.

**Dos Condados Capacitor Bank Installation.** Relocate one of the two 50 MVar capacitor banks at AEPCO's Morenci substation to AEPCO's Dos Condados substation. The driving factor for this project is reliability.

**FMI Morenci – TEP Joint Project.** The project will purchase a new 345/230 kV 400 MVA transformer for Morenci Water and Electric's (MW&E) Copper Verde substation and relocate the two existing transformers at Copper Verde to the AEPCO Greenlee substation and the AEPCO Bicknell substation and place them in satisfactory operation. Previous studies have identified TEP outages that have the potential to overload of AEPCO's Greenlee transformer during peak load periods. This project will alleviate these overloads. The driving factor for this project is reliability.

**Valencia to CAP Black Mountain 115 kV line.** This line segment was approved by the ACC Line Siting Committee on February 10, 2010 and by the Commission on April 14, 2010 (Case #152, Decision #71649) as part of the North Loop to Rattlesnake 115 kV Line Project. The project proposes a new 2.6 mile 115 kV line that will extend from the existing AEPCO Valencia Substation to tie to the turning structure of the 115 kV CAP line that heads directly north two miles to the existing Central Arizona Project (CAP) Black Mountain substation. The driving factor for this project is reliability on both AEPCO and CAP systems.

**Marana-Thornsdale-Saguaro Interconnect.** The project involves the construction of a new 115 kV line from the existing Marana substation to the Thornsdale substation and to acquire a single circuit of TEP's quad-circuit line from TEP's Tortolita substation, disconnecting from Tortolita, and connecting it to Saguaro, reenergizing the quad-circuit line to 115 kV and interconnect with AEPCO's Thornsdale substation. The driving factor for this project is reliability.

**Tombstone Junction Project.** This Cochise County project involves looping the AEPCO Butterfield to San Rafael 230 kV line into a new Scheffelin substation with a 230/69 kV transformation to the existing SSVEC Tombstone Junction substation and APS Boot Hill substation. AEPCO and APS are currently discussing project configuration and cost allocations for this project. The driving factor for this project is reliability.

## **ADDITIONAL PROJECTS UNDER CONSIDERATION**

AEPCO continues to study the feasibility of additional projects for inclusion into future Ten-Year Plans that have been deferred from previous Ten-Year Plans for various reasons.

A brief description of each of these projects follows, for information purposes only. A driving factor is provided for each of these projects per BTA recommendations. These projects are under consideration, but have not advanced far enough to have a projected in-service date.

AEPCO will continue to hold discussions with potential project participants throughout 2017, and if refined project scopes have been established with agreements from project participants, and with approvals from governing boards, these projects may be reflected in next year's Ten-Year Plan.

**Apache/Hayden to San Manuel 115 kV Line.** This project has been presented in previous AEPCO Ten-Year Plans, but has been deferred beyond the Ten-Year Plan horizon. It was approved by the ACC Line Siting Committee on May 12, 2009 and by the Commission on July 9, 2009 (Case #142, Decision #71218). The project proposes the extension of a new 4.5 mile 115 kV line from the existing AEPCO Apache to Hayden 115 kV line to the existing APS San Manuel substation. The value to AEPCO of this project depends on working out contact paths with APS connecting AEPCO to Trico Electric Cooperative, Inc. (Trico) loads from the east and north. This line project will require the agreement of APS and additional studies. The driving factor for this project is reliability.

**Thornsdale to Twin Peaks 115 kV Line.** The project proposes a new 8 mile 115 kV line between AEPCO's Thornsdale substation and the CAP Twin Peaks substation. With the addition of Valencia to CAP Black Mountain 115 kV line, and the Marana-Thornsdale-Saguaro Interconnect projects described in the previous section, this project would no longer be necessary. However, the same route may still be used as part of the Marana-Thornsdale-Saguaro Interconnect. The driving factor for this project has been load growth and reliability.

**Saguaro to Tucson 115 kV Line Loop-in To Marana.** With the addition of Valencia to CAP Black Mountain 115 kV line, and the Marana-Thornsdale-Saguaro Interconnect projects described in the previous section, this project is being studied as a sensitivity to determine additional reliability benefits that can be achieved. The driving factor for this project is reliability.



**Tab E – Projected Emission Quantities from Modeling  
Scenarios**

**THE PAGES BEHIND THIS TAB CONTAIN CONFIDENTIAL  
INFORMATION PROTECTED PURSUANT TO THE PROTECTIVE  
AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**



\*\*

*THE INFORMATION BEHIND THIS TAB HAS BEEN REDACTED, SUBJECT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.*

\*\*

**Tab F – Additional Numerical Results &  
AEPCO Modeling Scenarios**

**THE PAGES BEHIND THIS TAB CONTAIN CONFIDENTIAL  
INFORMATION PROTECTED PURSUANT TO THE PROTECTIVE  
AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**

\*\*

*THE INFORMATION BEHIND THIS TAB HAS BEEN REDACTED, SUBJECT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.*

\*\*



**Tab G – Supplemental Analysis regarding LCOE & Battery  
Storage**

**THE PAGES BEHIND THIS TAB CONTAIN CONFIDENTIAL  
INFORMATION PROTECTED PURSUANT TO THE PROTECTIVE  
AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.**

\*\*

*THE INFORMATION BEHIND THIS TAB HAS BEEN REDACTED, SUBJECT TO THE  
PROTECTIVE AGREEMENT BETWEEN AEPCO AND STAFF DATED MARCH 23, 2015.*

\*\*